

On Amphibia Salientia from the Ivory Coast

Collected by Dr. V. AELLEN

by

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With 2 figures in the text.

When Dr. AELLEN enquired if I would be willing to identify and report on the toads and frogs collected at the Centre suisse de Recherches scientifiques (C.S.R.S. for short), west of Abidjan, I welcomed the suggestion as no other West African area has been so neglected in its amphibiology. In the literature it is rare indeed to come across references to amphibians from the Côte d'Ivoire.

This hiatus in our knowledge was borne out by an examination of Dr. AELLEN's material, for, of the eighteen species collected, all but three or four are here recorded as

New for the Ivory Coast

<i>Xenopus tropicalis</i>	<i>Rana longirostris</i>
<i>Bufo c. camerunensis</i>	<i>Rana m. mascareniensis</i>
<i>Leptopelis viridis</i>	<i>Arthroleptis poecilonotus</i>
<i>Leptopelis boulengeri</i>	<i>Phrynobatrachus liberiensis</i>
<i>Hyperolius c. concolor</i>	<i>Phrynobatrachus aelleni</i> sp. nov.
<i>Hyperolius fusciventris</i>	<i>Phrynobatrachus parogoensis</i> sp. nov.
<i>Rana occipitalis</i>	<i>Phrynobatrachus alleni</i>
<i>Rana maccarthyensis</i> (known from Mt. Nimba)	

and two of these, as will be noted, are believed to represent undescribed species.

It is more than likely that several of the species listed above are specifically identical with some of the fifteen species, half of which were represented by single individuals, collected for dietary studies by PAULIAN and VILARDEBO (1947: 129-132).

As it is doubtful whether Dr. AELLEN's collection contains more than a third of the amphibian species occurring in the Ivory Coast, I consider it would be a mistake, at this time, to accede to his suggestion that I devise a key to aid in the identification of Ivory Coast amphibia. So incomplete a key would be likely to mislead local naturalists and result in many misidentifications appearing in print. Instead, after critical examination of each of the 172 specimens submitted, I have recorded in some detail the salient characteristics and variation displayed by this material. This study has led me to synonymize two species, viz.

Hyperolius nitidulus Peters, 1875 = *H. picturatus* Peters, 1875
Rana retropunctata Angel, 1949 = *R. maccarthyensis* Andersson, 1937.

Not only are Dr. AELLEN's specimens perfectly preserved and individually labeled, but the collector has been at considerable pains to record the coloration in life of many individuals. As this has not been done before for many of these West African frogs, I have translated these descriptions and included them under the heading "Color in life." Also included are the collector's notes on Breeding condition, Diet and Habitat.

This material is preserved in the Muséum d'Histoire naturelle of Geneva (Switzerland). The Museum of Comparative Zoology has some duplicates.

List of the Collecting Localities.

Abidjan, 5° 20' N, 4° 1' W.

Adiopodoumé (cf. C.S.R.S.).

Adjamé, 5° 21' N, 4° 2' W.

Banco, 5° 24' N, 4° 3' W.

Cosrou, 5° 19' N, 4° 39' W.

C. S. R. S., 5° 19-21' N, 4° 7-9° W.¹

¹ Centre Suisse de Recherches Scientifiques (C.S.R.S.) is understood in an extensive sense including the environs within a radius of 3-4 km., also the territory of O.R.S.O.M. (Office de la Recherche Scientifique Outre-Mer) and the village of Adiopodoumé.

Dabou, 5° 19' N, 4° 23' W.

Duékoué, 6° 45' N, 7° 22' W.

Duékoué, rock of the Panthère Blanche, 6° 46' N, 7° 23' W.

Gagnoa, 6° 7' N, 5° 58' W.

Ndzida, 5° 19' N, 5° 1' W.

Toupah, 5° 19' N, 4° 34' W.

Yapo Nord, 5° 46' N, 4° 7' W.

Yapo Sud, 5° 43' N, 4° 6' W.

PIPIDAE

Xenopus tropicalis (Gray)

Silurana tropicalis Gray, 1864, Ann. Mag. Nat. Hist. (3), 14, p. 316: Lagos, Nigeria.

23 (Nos. 233-6, 278, 341-2, 348-52, 374-7, 380, 383, 385-8, 430)
C.S.R.S. 15.IV-19.V.53.

5 (277, 279, 807-9) Banco Forest. 18.IV.53.

Snout covered with pustules; eye diameter included 3-4 (4 in only 8 frogs) times in the interorbital space; lower eyelid vestigial in lower anterior third of eye.

Color in life. No. 233. Above, dark brownish black with a slightly greenish tinge. No. 234. Above, khaki green spotted with dark blue. No. 236. Above, khaki brown irregularly spotted with black; two fine black lines commencing on the sides posteriorly extend as far as the anus. Below, rosy cream, irregularly marbled. No. 341-2. Above, olive brown spotted with black. Below, a slightly khaki, brownish grey, paler than on the dorsum. In alcohol. Entire series. Below, usually pale, occasionally dark, finely flecked or with scattered spots.

Size. Length of largest, a ♀ (430), 52 mm.

Diet. Stomach contents of 277 consists of insect fragments, some of which are recognisable as coming from aquatic coleopterous larvae.

Habitat. Several were taken in temporary roadside pools, others in deep forest.

Range. This is the first record of *tropicalis* for the Ivory Coast. In the Museum of Comparative Zoology *tropicalis* is represented by examples from Sierra Leone (2 localities); Liberia (5); Gold Coast (1); British Cameroon (3); French Cameroun (1).

Remarks. PARKER (1936 a: 157) provides figures illustrating the differences between *X. tropicalis* and *X. fraseri*, two fully distinct species that were erroneously synonymized by NOBLE (1924: 160) whose material was actually *fraseri* Boulenger.

BUFONIDAE

Bufo regularis regularis Reuss

Bufo regularis Reuss, 1834, Mus. Senckenberg, 1, p. 60: Egypt.

♂ juv. (54) At Km. 25 on Dabou road. 14.III.53.

juv. (96) Toupah. 20.III.53.

3 ♀♀ (97-8, 145) Cosrou. 20.III.53.

♀ (146) Abidjan. 21.III.53.

♀ (414) Gagnoa. 15.V.53.

♀ (455) Ndzida. 20.V.53.

♂ (823) C.S.R.S. VIII.51. J. G. Baer coll.

Width of tympanum more than half, usually from two-thirds to three-quarters, the eye diameter; parotids kidney-shaped; dorsum almost as tubercular as the flanks; flanks studded with low rounded tubercles.

Size. Length of larger ♂ (823), 55 mm.; of largest ♀ (145), 86 mm.

Habitat. A savannah form occurring in and congregating about pools in village.

Remarks. It seems advisable to refer these toads to the typical form which they resemble more closely than they do *B. r. maculatus* Hallowell of Liberia.

Bufo camerunensis camerunensis Parker

Bufo camerunensis camerunensis Parker, 1936, Proc. Zool. Soc. London, p. 153: Oban, Calabar, Nigeria.

♀♀ & juv. (310-1, 558, 576) Yapo Nord. 24.IV-4.VII.53.

♀ (725) Yapo Sud. 13.VIII.53.

Width of tympanum more than half, usually two-thirds, the eye diameter; parotids indistinct, straight and very narrow; dorsum distinctly smoother than the flanks which are studded with large conical tubercles; greatest length of third finger equals the distance from tip of snout to centre of eye.

Color in life. No. 558. Interorbital marks black and very distinct; from snout to anus a very light, hairlike, vertebral line. Below, yellowish.

Size. Length of largest ♀ (725), 72 mm.

Habitat. A virgin forest species.

RHACOPHORIDAE

Leptopelis viridis (Günther)

Hylambates viridis Günther, 1868, Proc. Zool. Soc. London, p. 487: West Africa.

5 ♀♀ (122, 207, 285, 384, 476) C.S.R.S. 25.III-1.VI.53.

2 ♂♂, 2 ♀♀ (306, 327-8, 557) Yapo Nord. 24.IV-2.VII.53.

Fingers, including outer, slightly webbed at base; disks of fingers and toes well developed; tibiotarsal articulation of adpressed hind limb reaches tympanum or just in front of eye, usually to the eye.

Color in life. No. 306. ♂. Above, greyish brown, spotted. Below, throat and chest white, otherwise greyish white. Iris reddish brown.

No. 327. ♂. Above, a dark triangular interorbital mark, otherwise brown variegated with greyish brown and some more or less longitudinally arranged black specks. Iris reddish brown except in its upper portion, which is orange.

No. 476. ♀. Above, a brown triangular interorbital mark, otherwise rosy brown with distinct brown markings. Below, white speckled with brown. Iris silver, its upper portion orange.

No. 557. ♀. Above, more or less dark grey irregularly flecked with creamy white; a dark triangular interorbital mark; no russet or brown. Below, creamy white. Iris greyish silver, its upper portion golden.

Color in alcohol. The characteristic semi-triangular interorbital mark is absent only in No. 306. Below, white; chin, throat and abdomen more or less flecked (C.S.R.S.) or marbled with greyish brown.

Size. Length of larger ♂ (306), 37 mm.; largest ♀ (476), 57 mm., the range of ♀♀ being 45-57.

Breeding. During April through June all ♀♀ were gravid.

Habitat. Taken at night in a tree at a height of six feet from the ground (327); at night in a bush (328); beneath the bark of a tree (557).

Leptopelis boulengeri (Werner)

Hylambates rufus var. *boulengeri* Werner, 1898, Verh. Zool.-Bot. Ges. Wien. 48, p. 197, pl. II, fig. 4: Victoria, Cameroon.

♀ (155) Yapo Nord 1.IV.53.

All fingers and fourth toe with 1 phalanx free, remaining toes webbed to disks; tibiotarsal articulation of adpressed hind limb reaches between eye and nostril.

Color in life. Above, a light, slightly reddish, brown; a very dark line across the snout, another between the eyes, and a third across the occiput.

Size. Length 52 mm.

Habitat. Taken at night on a tree, at a height of one and a half metres.

Remarks. Indistinguishable from Cameroon material of *boulengeri* in the Museum of Comparative Zoology, and specifically identical with a specimen from Mt. Coffee, Liberia (M.C.Z. 15939) formerly misidentified as *tessmanni* (BARBOUR & LOVERIDGE, 1930 a: 785).

Hyperolius concolor concolor (Hallowell)

Exalus concolor Hallowell, 1844, Proc. Acad. Nat. Sci. Philadelphia, p. 60: Liberia.

♀ (290) C.S.R.S. 21.IV.53.

♂ (319) Yapo Nord. 27.IV.53.

3 ♂♂ (440, 456-7) Ndzida. 25-28.V.53.

First and fourth toes with 1 phalanx free of web; second toe with 1 or a $\frac{1}{2}$ phalanx free, or actually webbed to the disk (in 319 only); third and fifth toes webbed to disks on one side; tibiotarsal articulation of adpressed hind limb reaches to eye, or between eye and nostril (in 319 only).

Color in life. No. 456. ♂. Uniformly light greenish yellow. No. 475. ♂. Above, more or less khaki with brown markings [of the *riggenbachi* type] on dorsum; from end of snout through eye to a point just above the axilla is a dark brown band, light-edged above; thighs on their upper and posterior portions, reddish.

No. 319. ♂. Above, light brownish. Below, creamy white.

No. 290. ♀. Above, orange yellow, the hind limbs and feet largely reddish. Below, rose, or more or less reddish. Iris blackish grey; pupil horizontally lozenge-shaped when closed, round when open.

Size. Length of ♂♂, 28-32 mm.; of only ♀, 39 mm.

Habitat. Taken at night on a bush, a tree, in bananas, and a hut.

Remarks. LAURENT (1951 *f*: 120) would transfer the Hyperoliinae from Rhacophoridae and place them in a new grouping with certain ranids, such as Arthroleptinae, for which he proposes the name Hyperoliidae.

This sedge-frog has recently been recorded from "Thiassale" (presumably Tiassalé), Ivory Coast by LAURENT (1951 *c*: 30). Typical *concolor* has consequently been reported from every country (except Nigeria) from Portuguese Guinea to the French Congo; east of which it is represented by various races.

Hyperolius picturatus Peters

Hyperolius picturatus Peters, 1875, Monatsb. Akad. Wiss. Berlin, p. 206, pl. II, fig. 2: Boutry, Ashanti, Gold Coast.

Hyperolius nitidulus Peters, 1875, Monatsb. Akad. Wiss. Berlin, p. 209, pl. III, figs. 4-4 *a*: Yoruba, Lagos, Nigeria.

♀ (257) C.S.R.S. 17.IV.53.

♀♀ (437, 449) Ndzida. 25-26.V.53.

First and fourth toe with phalanx free of web; second and third with $\frac{1}{2}$ a phalanx free, fifth with $\frac{1}{2}$ a phalanx (449) or webbed to the disk; tibiotarsal articulation of adpressed hind limb reaches hinder part of eye or to the eye.

Color in life. No. 257. Above, clear brownish; sides of head, neck and flanks flecked with black. Below, throat, abdo-

men and forelimbs golden yellow; underside of hands and hind limbs bright yellow. Iris a rosy reddish brown.

Habitat. Taken at night in a hut (437), and in a row of bananas (449).

Size. Lengths of these ♀♀ are 33, 35 and 36 mm.

Remarks. LAURENT (1951 *d*: 395) treats *picturatus* as a race of the Ethiopian *viridiflavus* Duméril & Bibron, and suggests that it ranges from the Gold Coast through Dahomey to Nigeria.

He also regards as a race of *viridiflavus*, *nitidulus* Peters, assigning it a range of from French Guinea to the Ivory Coast, having examined a ♂ taken between Alangouassou and "Mbayakio" (presumably M'bahiakrou). But PETERS described *nitidulus* from "Yoruba (Lagos)"¹, and the Yoruba country is in the hinterland behind Lagos, now a port on the coast of Nigeria. LAURENT (1951 *d*: 395) omits Yoruba and gives the type locality as "Lagos (in errore)" but gives no reasons here or in his longer discussion (1951 *c*: 43) for doubting PETERS' data. Perhaps on the grounds that it conflicts with his theory of what the distribution should be.

As a matter of fact two of Dr. AELLEN's three Ivory Coast frogs resemble *picturatus* much more closely than they do *nitidulus* and are scarcely distinguishable from two specimens from Lake Azingo, Gabon, French Congo. In each case one frog lacks the usual black flecks along the flanks. To my thinking *nitidulus* is simply a variant of *picturatus* in which some of the upper flecks have coalesced to form a more or less ill-defined line.

Hyperolius fusciventris Peters

Hyperolius fusciventris Peters, 1876, Monatsb. Akad. Wiss. Berlin, p. 122: Liberia.

♀ (381) C.S.R.S. 7.V.53.

First (scarcely) and fourth (clearly) toes with 1 phalanx free of web; second, third and fifth webbed to the disk on one side; tibio-tarsal articulation of adpressed hind limb reaches the eye.

Color in life. Above, uniformly spinach green delimited on the sides by a golden yellow line edged with vinous anteriorly; upper lip white; thighs anteriorly variegated with yellow, otherwise

¹ The correct reference is pl. iii, figs. 4-4 *a*, not as given by LAURENT.

uniformly vinous; limbs, including the metatarsus green, the latter edged with white and black; fingers and toes white suffused with vinous. Below, throat and abdomen vinous vermiculated with black and grayish white.

Size. Length of ♀, 27 mm.

Remarks. The Museum of Comparative Zoology has this species from Sierra Leone (2 localities) and Liberia (8 localities) where it is abundant. The only non-Liberian record in the literature is a somewhat doubtful one from Makomo, Spanish Guinea, given by NIEDEN (1908 *b*: 503). Consequently the species is new for the Ivory Coast, though one suspects that the Banco frog referred to *cincliventris* Cope (a species described from Umvoti, Natal) in PAULIAN and VILARDEBO's paper (1947: 131), may prove to be a *fusciventris*.

RANIDAE

Rana occipitalis Günther

Rana occipitalis Günther, 1858, Cat. Batr. Sal. Coll. Brit. Mus., p. 130, pl. 11: Gambia (restricted).

♂ (42) Near Adjamé. 14.III.53.

1 ♂, 3 ♀♀ (179, 494, 535, 818) C.S.R.S. 5.IV-29.VIII.53.

♂ (320) Yapo Nord. 27.IV.53.

Characterised by the conspicuous transverse fold connecting the posterior edges of the upper eyelids; toes webbed to tips; vomerine teeth in two oblique rows, anteriorly touching inner posterior edges of choanae.

Color notes. ♂. Iris reddish brown in life, pupil a vertical lozenge; retracted vocal sacs flesh-cream, greyish when inflated.

Size. Length of largest ♂ (42), 120 mm., a slightly smaller one weighed 120 grams. Length of largest ♀ (494), 127 mm., weight 235 grams.

Remarks. A key to the frogs of the genus *Rana* occurring in Liberia (LOVERIDGE: 1941 *e*: 134-135) will be found to cover all the Ivory Coast species mentioned in this present paper.

In 1950 LAURENT proposed separating *occipitalis* from *Rana* by reviving the generic name *Dicroglossus* Günther, 1860, two years

later DE WITTE reduced it to subgeneric rank which would seem a more reasonable allocation if no earlier name is available.

Rana albolabris albolabris Hallowell

Rana albolabris Hallowell, 1856, Proc. Acad. Nat. Sci. Philadelphia, p. 153: West Africa.

6 ♀♀ (78, 268, 272, 339, 368, 670) C.S.R.S. 17.III-31.VII.53.
♂ ♀ (397, 403) Duékoué. 13.V.53.

Vomerine teeth in two oblique rows between, though not in contact with, the choanae; tips of fingers and toes dilated into large disks; tibiotarsal articulation of adpressed hind limb reaches eye (in 2), between eye and nostril (15), or end of snout (1). In this species the vocal sacs are internal, but males are distinguished by a glandular swelling at base of forearm.

Color in life. No. 78. Above, rosy brown; flanks greenish grey. Below, white. No. 268. Above, slightly greenish brown; entire upper lip silvery white; sides greenish; thighs marbled with yellow green. Below, pure white with some grey spotting. No. 339. Above, olive green. Below, white.

Size. Length of only ♂ (403), 57 mm.; largest ♀ (78), 78 mm.

Habitat. Nos. 397 and 403 were taken in a rocky cave of the Panthère Blanche.

Rana maccarthyensis Andersson

Rana maccarthyensis Andersson, 1937, Arkiv. Zool., 29 A, No. 16, p. 9, figs. 3-4: Maccarthy Island, Gambia.

Rana (Ptychadena) retropunctata Angel, 1949, Bull. Mus. Hist. Nat. (Paris), (2), 21, pp. 509-511, fig.: Mount Nimba, French Guinea.

11 ♂♂, 1 ♀ ad., 1 ♀ juv. (176, 223, 237-43, 271, 347, 481, 550)
C.S.R.S. 5.IV-24.VI.53.

An inner and an outer metatarsal tubercle, latter usually connected by a series of minor or minute (often white-tipped) tubercles with first subarticular tubercle of fourth toe; fourth toe with 2 phalanges free of web, first toe usually with $1\frac{1}{2}$ (1 only in Nos. 239, 241; 2 only in 176), second toe (when entire) with 1 ($1\frac{1}{4}$ in 176), third toe with 1, fifth toe with $\frac{1}{2}$ or 1 phalanx free

of web; tibiotarsal articulation of adpressed hind limb reaches nostril (both ♀♀ and 3 ♂♂), end of snout (1 ♂), or well beyond (7 ♂♂). Males with a vocal sac whose aperture extends posteriorly toward lower insertion of forearm. One 48 mm. frog, well nourished, lacks its left foot, lost at some early age.

Color in life. The collector was much struck by the variability of this species, the presence or absence of a vertebral line, etc.

No. 239. 38 mm. ♂. As 238, but yellow more pronounced and extending almost as far as the chest.

No. 238. 39 mm. ♂. Above, a light vertebral line. Below, creamy white, slightly spotted with brown; vocal sacs greenish grey; thighs and abdomen yellowish.

No. 243. 40 mm. ♂. Above, rosy brown, the thighs marbled with bright yellow. Below, throat and chest anteriorly cream, chest posteriorly to anus, thighs and legs, sulphur yellow.

No. 347. 42 mm. ♂. Above, brownish gray; head with a black interorbital crossbar; on the dorsum the rectangular black spots are more or less regularly disposed, a strikingly $\wedge$ -shaped mark; dorsolaterally and on the flanks are an upper and lower longitudinal series of black spots. Below, retracted vocal sacs greenish, but yellow-green striated with yellow when inflated; otherwise below, yellowish white, more yellow on the belly. Iris black, its upper portion golden, the lower part reddish brown.

No. 550. 48 mm. ♂. Above, vertebral line light orange brown. Below, retracted vocal sacs black, greyish when inflated.

No. 237. 52 mm. ♂. Above, a light vertebral line. Below, golden yellow including vocal sacs; chest ivory white. Iris in its upper part bright golden.

No. 481. 60 mm. ♀. Above, the very conspicuous vertebral line light brick red, otherwise brownish grey

tinged with olive and spotted with black; sides grey, yellow towards the loins. Below, creamy white, slightly yellowish on the belly and hind limbs.

Size. Length of largest ♂ (237), 52 mm.; only adult ♀ (481) 60 mm.

Breeding. On April 13 the males were taken when calling "crak", abruptly and somewhat weakly, from a depression in deep forest; no females were seen. On June 1 a female was taken distended with ova.

Remarks. I have compared these frogs with a cotype of *macCarthyensis*, a species apparently overlooked by ANGEL when he described *retropunctata* from five frogs, whose adpressed tibiotarsal articulations failed to pass the end of the snout (between eye and nostril in two ♀♀, nostril in three ♂♂). None were of large size, however, the ♂ and ♀ syntypes being 30 and 36 mm. respectively, and a "Gouela" (? Goueia) ♀ only 41 mm. I have no hesitation in synonymizing *retropunctata* with *macCarthyensis* which is represented in the Museum of Comparative Zoology by specimens from Gambia (2 localities), Sierra Leone (2), and Liberia (4). MERTENS (1938 a: 242) has recorded the species from Senegal and the French Sudan, but it is new for the Ivory Coast if ANGEL's record for Mount Nimba is considered as French Guinea.

Rana longirostris Peters

(See Fig. 1)

Rana longirostris Peters, 1870, Monatsb. Akad. Wiss. Berlin, p. 646, pl. I, fig. 5: Keta, Togo (as Guinea).

1 ♂, 2 ♀♀ (45-47) C.S.R.S. 14.III.53.

4 ♂♂, 1 ♀ (159, 325-6, 567-8) Yapo Nord. 1.V-30.VI.53.

First, second and third toes with $\frac{1}{2}$ a phalanx free of web, fourth with 1 phalanx free, fifth webbed to tip; tibiotarsal articulation of adpressed hind limb reaches just beyond (in 1) or well beyond (7) end of snout.

Color. There is a tendency for the backs of ♂♂ to be flecked with black, while those of ♀♀ are usually uniformly grey in alcohol.



FIG. 1.

Rana longirostris Pet. ♀ No. 46.
Phot. Aellen.

Their variability in life caused Dr. AELLEN to note them down as follows:

No. 325. 45 mm. ♂. Above, olive brown, back with a few dark brown spots; sides from snout to groin and along hind limb to foot, a sharp-edged, blackish brown band very distinct from the dorsal colouring; thighs marbled with yellow and a little green. Below, throat pale yellow; retracted vocal sacs black, grey when dilated; chest creamy yellow; belly yellow; hind limbs greenish yellow. Iris reddish brown.

- No. 567. 47 mm. ♂. Above, cinnamon. Below, slightly greenish yellow; retracted vocal sacs black, grey when inflated. Iris golden yellow on upper portion.
- No. 45. 48 mm. ♂. Above, greenish grey; thighs marbled with bright yellow. Below, vocal sacs grey; throat uniformly white; belly canary yellow.
- No. 159. 48 mm. ♂. Above, brownish grey; hind legs transversely banded. Below, white, the belly and thighs somewhat yellow.
- No. 568. 53 mm. ♂. Above, slightly greyish olive. Below, yellow with the chest whitish; inflated vocal sacs pale grey. Iris as in No. 567.
- No. 47. 57 mm. ♀. Above, khaki; otherwise resembles No. 46.
- No. 326. 61 mm. ♀. As No. 325.
- No. 46. 63 mm. ♀. Above, light rosy brown; thighs marbled with yellow and green. Below, light yellow, uniform; soles of feet dark brown.

Size. Length of largest ♂ (568), 53 mm.; largest ♀ (46), 63 mm.

Breeding. On March 14 Nos. 45 and 46 were in *coitu*.

Habitat. Nos. 325 and 326 were taken at night in a waterfilled rut and on a forest path respectively.

Rana mascareniensis mascareniensis Duméril & Bibron

Rana mascareniensis Duméril & Bibron, 1841, *Erpét. gén.*, 8, p. 350: Madagascar; Mauritius; Seychelles.

7 ♂♂, 8 ♀♀, 10 juv. (34, 79, 123, 125-6, 177, 183, 203-4, 209, 224-5, 254-5, 266-7, 270, 363, 366, 369-73, 482) C.S.R.S. 12.III-5.VI.53.

First, second and third toes with 1 (sometimes rather more) phalanx free of web, fourth with 2-2½ (usually 2½) phalanges free, fifth with ½-1 (usually 1) phalanx free of web; tibiotarsal articulation of the adpressed hind limb reaches nostril (in 2), end of snout (2), or clearly beyond (20).

One ♂ (267) is without a vertebral line; 4 ♂♂ and 11 ♀♀ and

young have a hairlike vertebral line; 2 ♂♂ and 7 ♀♀ display a broad, ribbonlike vertebral line.

Color in life. Dr. AELLEN compares a ♂ (482) *masca-reniense* with a ♀ (481) *macCarthyense* taken the same day, remarking that the coloration of the ♂ is somewhat similar but more olivaceous, the vertebral line yellowish green, and the inflated vocal sacs a light grey.

- No. 369. ♂. Above, generally pale; vertebral line broad and a light golden yellow, as are the outermost dorso-lateral keels and the prolongation of the upper lip; tympanum light brown with a median reddish brown spot. Below, pale golden white, slightly yellow on the abdomen. Iris golden yellow on its upper portion.
- Nos. 370-2. ♂♂. Above, vertebral line hairlike, yellow. Below, peppery white (371); vocal sacs brownish white (370) or black (371-2).
- No. 183. ♂. Retracted vocal sacs black, grey when inflated.
- No. 267. ♂. Above, no vertebral line; the third skin fold anteriorly, and whole of the fourth, light yellow. Below, vocal sacs grey.
- No. 373. ♀. Flanks variegated with silvery white.
- No. 254. ♀. Above, vertebral line broad, on either side of it four parallel, longitudinal skin folds bearing (squarish) black blotches; thighs yellowish. Below, upper lip to behind the commissure golden; throat and chest cream; abdomen yellow. Length 52 mm.
- No. 255. ♀. Above, vertebral line very fine but distinct, otherwise like No. 254 except that the dorsal skin folds are less regular, more broken. Length 55 mm.
- No. 266. ♀. Above, vertebral line greenish yellow. Below, upper lip reddish brown. Iris golden on its upper portion. Length 58 mm.

Size. Length of largest ♂ (482), 53 mm.; largest ♀♀ (266; 270), 61 mm.

Arthroleptis poecilonotus Peters

Arthroleptis poecilonotus Peters, 1863, Monatsb. Akad. Wiss. Berlin, p. 446: Boutry, Ashanti, Gold Coast.

13 ♂♂, 30 ♀♀ (19-24, 31-2, 35-38, 41, 43, 59-66, 70-7, 82, 178, 184-6, 196-202, 654) C.S.R.S. 10.III-28.VII.53.

1 ♀ (664) Banco Forest. 30.VII.53.

♀ hgr. (409) Duékoué. 14.V.53.

♀ hgr. (460) Ndzida. 28.V.53.

Toes terminate in tiny disks (except when shrivelled), without (or with the merest trace of) web; an inner metatarsal tubercle only; tibiotarsal articulation of the adpressed hind limb reaches the eye in every specimen (12 ♂♂; 33 ♀♀), though barely in three gravid ♀♀. Length of ♂♂ (distinguished by their dark chins, and sometimes throats), 20-27 mm., average 23 mm. Their backs may be uniform (1), or with a more or less distinct hourglass pattern (11), on which may be superimposed a hairlike (2) or broad, ribbonlike (1) vertebral line. Length of ♀♀ (distinguished by larger size and white or freckled throats), 24-33 mm., average 27 mm. Their backs may be uniformly pale fawn or dark brown (4 + 2), more usually grey with an hourglass pattern (16) on which may be superimposed a hairlike (2) or broad, ribbonlike (2) vertebral line.

Breeding. On April 10 at C.S.R.S. a 23 mm. ♂ (201) and 30 mm. ♀ (202) were taken in *coitu*. Between March 10 and July 30 most, if not all, adult ♀♀ were gravid.

Phrynobatrachus liberiensis Barbour & Loveridge

Phrynobatrachus liberiensis Barbour & Loveridge, 1927, Proc. New England Zool. Club, 10, p. 14: Gbanga, Liberia.

♀ juv. (323) Yapó Nord. 30.IV.53.

♂ ad. (396) Duékoué. 13.V.53.

Toes terminate in tiny disks, the first and second narrowly webbed to the disk or with $\frac{1}{2}$ a phalanx free, third with 2 phalanges free, fourth with 3, and the fifth with 2 phalanges free of web; tibiotarsal articulation of the adpressed hind limb reaches end of snout; a well-developed outer metatarsal tubercle, a very small and indistinct inner one, and an ill-defined tarsal tubercle which is

little more than a skinfold in the adult, indistinguishable in the young.

Size. Lengths of these ♂♂, 23 and 30 mm. respectively.

Habitat. The Yapo frog was taken on the forest floor, the adult in a rocky cavern of the Panthère Blanche.

Remarks. These have been compared with the series of types in the Museum of Comparative Zoology, which has the species from five localities in Liberia. It is new for the Ivory Coast. PARKER (1936 a: 148) has referred to this species, though with some misgivings, two ♂♂ from Eshobi, Mamfe Division, British Cameroon.

Phrynobatrachus aelleni sp. nov.

(See Fig. 2)

Type. Muséum d'Histoire naturelle of Geneva, Switzerland, No. origin. 538, an adult ♂ taken in a temporary pool on a forest trail near the research centre (C.S.R.S.) to the west of Abidjan, Ivory Coast. Collected by V. AELLEN, June 22, 1953.

Diagnosis. A large dark-cheeked species with $><$ glandular folds on the scapular region of the uniformly coloured dorsum; hinder side of thighs with a conspicuous light longitudinal line between two darker bands extends from anus to back of knee; lower surface of hind legs, more especially the tibia, exhibit large brown spots; fourth toe with three terminal phalanges free of web, the third toe with one and a half or two joints free; a tarsal and two metatarsal tubercles.

Description. Head slightly longer than broad; snout rather prominent, pointed, longer than the eye diameter; nostril nearer end of snout than eye; canthus rostralis somewhat angular; loreal region slightly oblique, scarcely concave; interorbital space broader than an upper eyelid; tympanum somewhat indistinct, raised in centre, greater than half the eye diameter; tongue with a median papilla.

Finger tips dilated into definite disks, first shorter than second which is shorter than fourth, third the longest, its length equalling the distance from snout to orbit; toes with small, but distinct, disks, first and second toes webbed to the disk, third with $1\frac{1}{2}$ or almost 2 phalanges free of web, fourth with 3 phalanges free, fifth with 1 phalanx free and only a narrow seam of web on next phalanx,

third toe extending beyond the fifth; an outer and an inner metatarsal tubercle which are as far from each other as is the inner from the small tarsal tubercle; tibiotarsal articulation of the adpressed hind limb reaches the end of snout; length of the tibia contained about $1\frac{3}{4}$ times in the length from snout to vent.



FIG. 2.

Phrynobatrachus aelleni sp. nov. type ♂ No. 538.
Phot. Aellen.

Skin of head and back shagreened, from the upper eyelids glandular folds converge to an imaginary line connecting the forelimbs, then diverge on the dorsum. Below, smooth.

COLOR. Above, crown of head dark grey merging on the back into the paler grey of the flanks, a single azygous black spot on dorsum above the right groin; side of face from end of snout very dark brown (tinged with green in life) with a few scarcely discernible white specks along upper lip, edged above by a light canthal line, this dark band continues through eye to the insertion of the forelimb; flanks pale grey with a few inconspicuously small flecks of white and darker grey; thigh anteriorly with a linear

series of light-edged dark dashes or blotches, posteriorly with a light (golden yellow in life) longitudinal line, more or less edged with dark brown above, and markedly so below by a broader band that extends from anus to hinder side of the knee; upper aspect of tibia pale grey with four faint crossbands of darker grey.

Below, chin and throat dark grey becoming paler posteriorly and terminating on chest; rest of undersurface creamy white, becoming yellow posteriorly and on the hind limbs; tibia strikingly blotched with variable-sized brown spots; heel to sole, as also elbow to palm, blackish brown, which colour does not extend to the digits.

Size. Length from snout to anus of ♂ holotype, 37 mm.; length of hind limb, 63 mm.

Phrynobatrachus parogoensis sp. nov.

Type. Muséum d'Histoire naturelle of Geneva, Switzerland, No. origin. 458, a gravid ♀ taken in a banana plantation at Ndzida near coast, Ivory Coast. Collected by V. AELLEN, May 25, 1953.

Paratype. Museum of Comparative Zoology, Cambridge, Mass. No. origin. 459, a gravid ♀ with same data as the type.

Diagnosis. Differs from *o. ogoensis* and *o. brongersmai*, which it resembles in many respects, in the more extensive webbing of the first, second and fifth toes; probably shorter limb; and in lacking the conspicuous light and dark barring of the lips which is so characteristic of *o. ogoensis* and *o. brongersmai*; nor are there any large spots on the throat and breast of the new species.

In amount of webbing the new species approaches *plicatus* (Günther), but differs from that widespread amphibian in many ways.

Description. (Paratype variations are given in parentheses). Head slightly broader than long (slightly longer than broad); snout scarcely pointed, chiefly rounded; nostril nearer end of snout than eye; canthus rostralis rounded; loreal region somewhat oblique, scarcely concave; interorbital space as broad as (or slightly narrower than) an upper eyelid; tympanum somewhat indistinct, raised in centre, its diameter more than half that of the eye; tongue with a median papilla.

Finger tips slightly dilated and pointed, first shorter than second, which is shorter than fourth, third the longest, its length

equalling the distance from end of snout to orbit; toes with small, but distinct, pointed disks, first and second toes webbed to the disks, third with 1 phalanx free of web, fourth with 2 phalanges free, fifth webbed to disk and subequal in length to the third; an outer and an inner metatarsal tubercle which are as far from each other as is the inner from the small tarsal tubercle; tibiotarsal articulation of the adpressed hind limb reaches the tympanum; length of the tibia contained more than twice ($2\frac{1}{2}$ times) in the length from snout to anus.

Skin of head and back smooth, from the upper eyelids rather inconspicuous glandular folds converge to an imaginary line connecting the forelimbs, then diverge on the dorsum. Below, smooth.

Color. Above, dark brown; from snout to anus a 2 mm. ($1\frac{1}{2}$ mm.) broad light pinkish (darker in centre) vertebral line; dorsolateral area pale, mottled with darker; lips grey more or less flecked with white; side of head through nostril and eye to halfway (or groin) along flank an illdefined, more or less continuous, dark band; thighs above, pale heavily marbled with dark brown, circum-anal area dark brown extending as an ill-defined band to hinder side of the knee; upper aspect of tibia pale brown with four, conspicuous, dark brown crossbands and other scattered markings.

Below, chin and throat very pale grey dotted with white; chest, abdomen and thighs anteriorly white, thighs posteriorly vermiculated with brown; outer part of heel to sole, also elbow to palm though less noticeably, blackish brown, extending on to the toes, but not on to the fingers.

Size. Length from snout to anus of ♀ holotype (458), 26 mm., of paratype ♀ (459), 24 mm.; length of hind limbs 37 and 34 mm. respectively.

Phrynobatrachus alleni Parker

Phrynobatrachus alleni Parker, 1936, Zool. Meded., 19, p. 91: Firestone Plantation No. 3. Du River, Liberia.

♀ (559) Yapo Nord. 28.VI.53.

Toes terminate in tiny disks, the first, second, third and fifth webbed to the disks, the fourth with 2 phalanges free (except for an exceedingly narrow seam on the penultimate joint); a well-deve-

loped outer metatarsal tubercle, a small but distinct inner one, and an ill-defined tarsal tubercle; tibiotarsal articulation of adpressed hind limb reaches slightly beyond end of the snout.

Size. Length of ♀, 25 mm.

Remarks. Compared with ♂ and ♀ paratypes of *alleni*, a species hitherto known only from half-a-dozen localities in Liberia, and one in Gold Coast.

*Summary of the Extent of Webbing in these Ivory Coast
Phrynobatrachus.*

Species	Sex	No.	Number of joints free on				
			1st	2nd	3rd	4th	5th
			toes				
<i>liberiensis</i>	♂	323	$\frac{1}{2}$	$\frac{1}{2}$	2	3	2
»	♂	396	0 or $\frac{1}{2}$	0 or $\frac{1}{2}$	2	3	2
<i>aelleni</i>	♂	538	0	0	1 $\frac{1}{2}$ or 2	3	1
<i>parogoensis</i>	♂	458	0	0	1	2	0
»	♀	459	0	0	1	2	0
<i>alleni</i>	♀	559	0	0	0	2	0

For comparison with data of Liberian species listed in LOVERIDGE (1941 *e*: 137-139).

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¹ Where a date is followed by a letter of the alphabet it indicates that, during the year cited, the author in question published more than one paper on African herpetology. The latter has chronological significance in a more comprehensive bibliography of African herpetology (1880-1954) which it is hoped may be published in the not too-distant future.

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